J. B. CRANDON.

ATTACHMENT FOR SULFUR BURNERS.

APPLICATION FILED JAN. 9, 1920.

1,397,724. Patented Nov. 22, 1921.

Fig. 1.

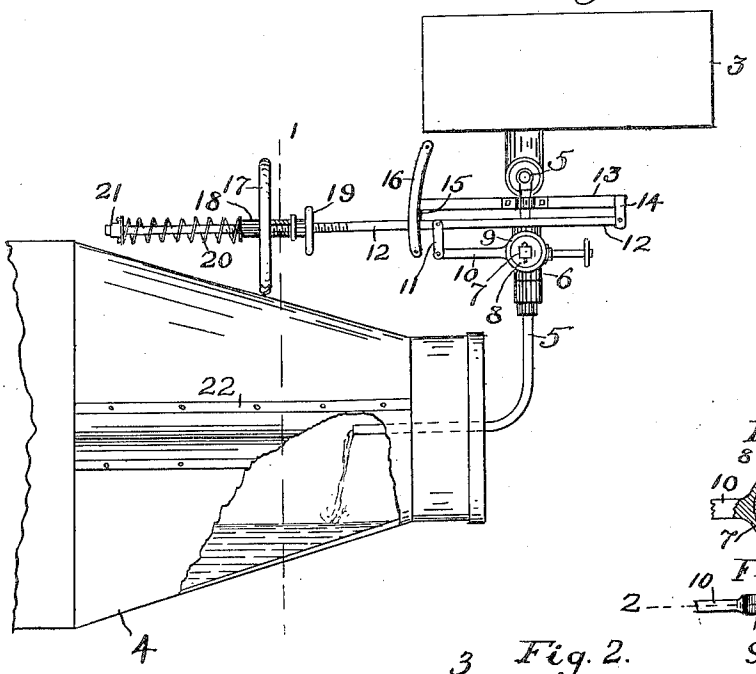


Fig. 4.

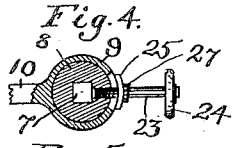


Fig. 5.

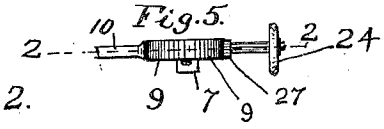


Fig. 2.

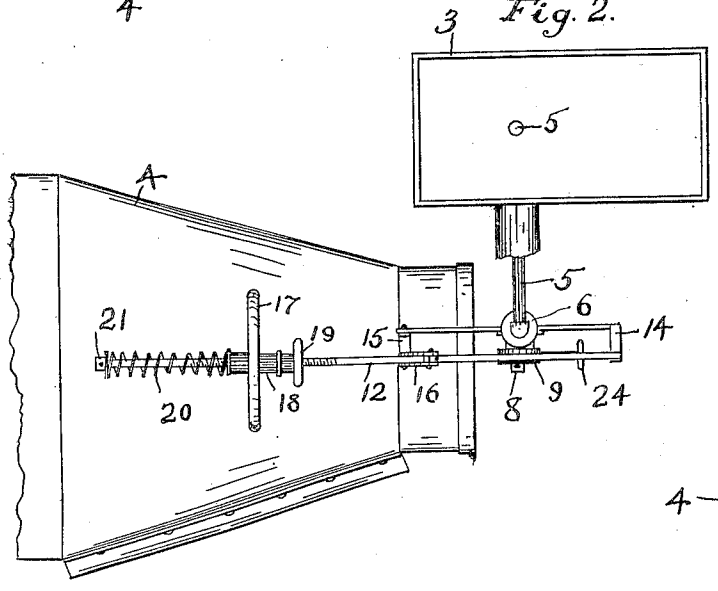
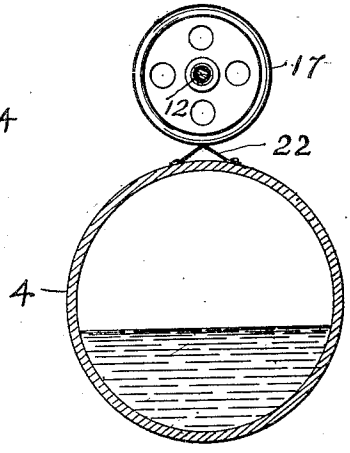


Fig. 3.



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by S. W. Bates Atty.

UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR SULFUR-BURNERS.

1,397,724. Specification of Letters Patent. Patented Nov. 22, 1921.

Application filed January 9, 1920. Serial No. 350,484.

To all whom it may concern:

Be it known that I, JOSEPH B. CRANDON, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Attachments for Sulfur-Burners, of which the following is a specification.

My invention relates to sulfur burners such as are used in making the sulfur dioxid in sulfite mills for the production of sulfite of lime.

These burners usually consist of hollow cylindrical castings having conical ends with a feed opening at one end and a discharge opening for the gas at the opposite end.

The sulfur is fed to the burner from a tank of melted sulfur through a cock or valve which is usually steam jacketed to hold the sulfur in a melted condition, and the feed pipe enters the open conical end of the burner and drops in a stream which takes fire just inside of the burner.

The body of melted and burning sulfur remains in the bottom of the rotary burner and it is desirable to keep this liquid sulfur always at the same level.

The valve which controls the sulfur feed is usually of considerable size as compared with the capacity of the feed pipe to guard against plugging and as a rule it is open about one quarter of its capacity leaving a narrow opening for the sulfur to pass through.

The sulfur used is transported in open cars and contains a great many cinders and these cinders lodging in the valve frequently plug it up and stop the flow of sulfur. This is liable to cause "freezing" of the sulfur within the pipes and a general disturbance of the feed, resulting in variations in the character of the gas produced and often causing the shutting down of the sulfur burning plant for the purpose of cleaning out the pipes.

The object of my invention is to insure steady and uniform feed to the burners so that the level of the melted sulfur in the rotating burner will remain the same, the combustion of the sulfur will be always uniform and so that the proportion of air and sulfur will remain uniform thus preventing the overheating and subliming of the sulfur resulting in the formation of free sulfur or sublimate which causes great trouble in clogging up the coolers and otherwise. I accomplish this purpose by intermittently opening the valve which controls the flow of melted sulfur for a short period of time to allow any obstruction to be swept through the opening and then closing it again to its normal position. In this way the lodging of cinders and other obstructions in the contracted valve opening is prevented and a uniform feed is assured.

In the accompanying drawing, I have illustrated an embodiment of my invention designed to be used in connection with the standard feed apparatus now in general use in sulfite pulp mills.

In the drawing, Figure 1 is a side elevation with a portion cut away to show the interior of the burner.

Fig. 2 is a plan,

Fig. 3 is a section on the line 1—1 of Fig. 1,

Fig. 4 is a section on the line 2—2 of Fig. 5 and,

Fig. 5 is a detail plan of the arm by which the valve is operated by hand, with adjacent parts.

Referring to the drawing, 3 represents the melting tank, 4 the burner, 5 the steam jacketed supply pipe, and 6 the steam jacketed valve which controls the supply.

These parts are all common and well known in this class of apparatus and require no more specific description.

I provide means by which the valve may be opened intermittently to a much greater extent than its normal opening which is usually but a fraction of its full capacity leaving a relatively narrow crack through which the melted sulfur passes. As the most convenient means for doing this work I connect the valve with the rotating mechanism which is provided for the purpose of revolving the burner.

As here shown, I make use of the rotation of the burner itself or its rotating mechanism to open the valve for a short period of time during each revolution of the burner.

These valves are usually constructed with a square wrench-hub 7 and on the wrench-hub 7 I fit a circular disk 8 having a strap 9 which embraces the disk.

The strap 9 has connected with it an arm

10, the disk, strap and arm forming in effect a wrench by which the valve may be opened and closed.

As herein shown, motion is imparted to the arm 10 to open the valve intermittently by a lever which contacts normally with the conical end of the burner and the lever is lifted intermittently by a cam surface formed on the burner for the purpose of moving the lever at each revolution and thereby intermittently opening the valve.

Pivoted by its end is a lever 12 connected by a link 11 with the arm 10 which controls the valve.

The lever extends preferably some distance beyond the valve, relative to the burner, and its end is pivoted to the arm 14 which projects out from a supporting yoke 13 clamped to the permanent supply pipe 5. The yoke 13 extends for some distance on each side of the pipe and the end nearest the burner is provided with an arm or offset 15 on the end of which is secured a pair of guides 16. Between these guides the lever 12 is adapted to slide vertically and to be steadied against lateral displacement.

The end of the arm 12 nearest the burner is raised and lowered by a wheel 17 which rests normally on the conical surface of the burner 4 and is journaled on the lever 12 suitably formed for this purpose.

The wheel 17 has hubs which extend out in both directions and provide a relatively long bearing on the lever.

The wheel 17 may be adjustably moved in opposite directions along the lever 12. It is moved toward the end of the shaft by a hand nut 19 which engages a screw thread formed on the lever and impinges against the hub 18.

It is moved in the opposite direction by a coil spring 20, one end of which acts against the hub 18 and the other end against the adjusting nut 21.

To intermittently raise the wheel and so open the valve, I secure to the burner a rib 22 over which the wheel rides when the burner revolves and which lifts the free end of the lever and opens the valve for an instant.

Means are provided by which the valve may be operated by the old hand wrench as it is usually operated when the automatic mechanism is disconnected.

As here shown, the disk 9 has formed in its edge a screw threaded radial opening into which screws the inner end of an arm 23 having on its end a hand wheel 24. The strap has formed in it a circumferential slot which allows the strap 9 and arm 10 to move some distance without imparting motion to the arm 23. A clamp or brake 25 bears against the strap and has an opening through which the arm passes. A shoulder 27 on the arm 23 enables it to force the brake 25 into contact with the strap thus preventing the strap from turning on the disk. The effect of the construction is, by turning the arm 23 in one direction, to clamp together the arm 23 and the arm 10 so that when one is moved the other will move. On the other hand, when the arm 23 is turned in the other direction the two arms are separated and each may act independently of the other.

Thus in ordinary use, the arm 23 is adjusted to leave the feed valve open to just the desired extent to feed sulfur at the required rate, the arm is then tightened clamping the strap to the disk. The automatic control is then in effect opening wide the valve at each revolution of the burner and returning it to its normal position.

If anything happens to interfere with this control the arm 23 is loosened and the automatic control is disconnected and the valve may be operated by hand in the old way.

The wide opening of the valve intermittently constantly frees it from cinders and other foreign matter which tend to clog up the small opening normally formed in the valve and the regular feeding of the burner is thus effected.

By moving the wheel 17 longitudinally the normal opening of the burner may be varied, and a much more delicate adjustment effected than by the use of the arm 23.

It is evident that the valve may be operated not only by the cam surfaces on the conical end of the burner but by any of the moving parts which go to make up the burner as a whole such as gears, counter shafts, etc.

I claim:

1. In a rotary sulfur burner for burning melted sulfur, the combination of a feed pipe for feeding the melted sulfur thereto, a valve for said pipe and means actuated by the rotating burner mechanism for intermittently opening said valve wider than its normal opening to clear possible obstructions.

2. In a rotary sulfur burner for feeding melted sulfur, the combination of a pipe for feeding the melted sulfur thereto, a valve in said pipe, an arm on said valve, the outer portion of which is adjacent to said burner and a cam section on said burner for contacting with and actuating said arm to intermittently open said valve.

3. In a rotary sulfur burner for burning melted sulfur, the combination of a pipe for feeding the melted sulfur thereto, a valve in said pipe, an arm on said valve, a wheel on said arm held adjacent to said burner and a cam section on said burner for contacting with said wheel to intermittently open said valve.

4. In a rotary sulfur burner for burning melted sulfur, the combination of a pipe for feeding the melted sulfur thereto, a valve in said pipe, a manually operable arm and a mechanically operable arm on said valve, clamping means for connecting said arms, said latter arm held adjacent to the rotary burner and a rib on said burner for intermittently lifting said arm to open said valve.

5. In a rotary sulfur burner for burning melted sulfur, the combination of a pipe for feeding the melted sulfur thereto, a valve in said pipe, a manually operable and a mechanically operable arm on said valve, a wheel on the latter arm held adjacent to the rotary burner, a rib on said burner for intermittently lifting said arm to open the valve and clamping means for clamping the two arms together.

6. In a rotary sulfur burner for burning melted sulfur, the combination of a pipe for feeding the melted sulfur thereto, a valve in said pipe, a valve stem for said valve having a wrench hub, a disk having a central opening fitting over said hub and having a radial screw threaded opening in its edge, a rotatable strap on said disk having a circumferential slot, a mechanically operable arm connected to said strap, a radial arm extending through said slot having a screw threaded end engaging said opening and a clamping shoulder for engaging and locking said strap, a wheel on said mechanically operable arm held adjacent to the rotating burner and a rib on said burner for intermittently lifting said arm to open said valve.

7. In a rotary burner for burning melted sulfur and having a conical end, the combination of a feed pipe, a valve in said feed pipe, an arm on said valve, a wheel mounted on said arm and resting adjacent to said conical end, a rib on said conical end for intermittently raising said wheel to raise said arm and means for adjusting said wheel longitudinally on said arm to vary the intermittent opening of the valve.

8. In a rotary burner for burning melted sulfur, the combination of a feed pipe, a valve therefor, an arm for said valve, an anti-friction device for said arm adapted to rest adjacent the burner, a cam surface on said burner for acting on said anti-friction device to intermittently open said valve, and a guide for holding said arm against lateral displacement.

In testimony whereof I have affixed my signature.

JOSEPH B. CRANDON.